



Airship-based observations of formaldehyde in the planetary boundary layer over rural Finland

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Formaldehyde (HCHO) is an important tracer for oxidative processes in the atmosphere such as oxidation of volatile organic compounds (VOCs) and production of HO₂ radicals (by photolysis or reaction with OH). Products of VOC oxidation and radical cycling, such as aerosols and tropospheric ozone, have direct impacts on human health. During the Pan-European Gas-AeroSOls Climate Interaction Study (PEGASOS), HCHO measurements were obtained together with OH reactivity, OH, HO₂, CO, O₃, NO_x, HONO, HONO, VOCs, and aerosol particle size distribution. HCHO concentration was measured by the Madison Fiber Laser-Induced Fluorescence (FILIF) instrument, optimized for flight campaigns to accommodate size and power requirements. Here we present data collected in rural areas near Jämijärvi, Finland in Spring 2013. Finland provides a pristine environment, allowing investigation of primarily biogenic emission and cycles. Measurements were carried out aboard a Zeppelin, which flew vertical profiles ranging in altitude from ~ 200 – 1000 meters. In this way, we studied the height-dependent evolution of the lower atmosphere, in which most VOC oxidation chemistry occurs. Flights were carried out with starting times ranging from sunrise to post-sunset. We present overall trends seen during the campaign of HCHO and related species within the context of VOC oxidation and secondary pollutant production.